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ABSTRACT

The follow-up study described in this paper tried to accomplish three major objectives: (a) to investigate the preschool and newborn antecedents of intellectual functioning, (b) to determine if there were stabilities from two and a half to seven and a half in the tempo and style of free play--and here we were looking for both isomorphic and metamorphic continuities in style of play and, (c) to check for stabilities and precursors of the young child's social relations. Out of the original sample seen at the newborn and preschool periods, we saw 35 males and 27 females for half day assessment of play, and social and cognitive behavior when they were seven and a half years of age. Data were collected from three sources: (a) a 30-minute sample of free play, (b) measures of intelligence, cognitive style, and motor ability obtained from the child, and (c) measures of peer and family relations and social maturity obtained from the mother. Preschool verbal communication was positively related to verbal IQ, social maturity and exploring in play at seven and a half years of age. High verbal males and females were brighter, more socially mature and spent more time exploring a novel play setting. Low verbal males appear to be less cautious, more impulsive and frenetic in their shifts of activity, darting from one activity to another. Low females appear hesitant, timid and cautious, not playing much and shifting in a slow deliberate manner. (Author/MK)

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RELATION OF PRESCHOOL VERBAL COMMUNICATION TO LATER VERBAL INTELLIGENCE, SOCIAL MATURITY, AND DISTRIBUTION OF PLAY BOUTS

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In a symposium presented at the Society for Research in Child Development meetings earlier this year we reported on some relations between several measures of effective attack on physical barriers at the preschool period and intelligence and social behavior at seven and a half years of age. Briefly, we found for both boys and girls, that effective barrier performance at the preschool period was positively related to IQ, imagination and vigor in play, and coping with novelty and peers at age seven and a half.

What I wish to do today is to extend our analysis of the preschool antecedents of verbal intelligence and social maturity and to analyze some of the complex sex differences that arise when we consider some of the preschool antecedents of free play behavior measured at seven and a half years of age.

We felt that a follow-up would be valuable because the data would be obtained at an age when individual differences in personality development have become relatively stable. Relations to early preschool and newborn behavior would be especially important in understanding early behavioral development.

In the follow-up study we tried to accomplish three major objectives: (a) to investigate the preschool and newborn antecedents of intellectual functioning, (b) to determine if there were stabilities from two and a half to seven and a half in the tempo and style of free play -- and here we were looking for both isomorphic and metamorphic continuities in style of play and, (c) to check for stabilities and precursors of the young child's social relations.

Out of the original sample seen at the newborn and preschool periods, we saw 35 males and 27 females for a half day assessment of play, and social and cognitive behavior when they were seven and a half years of age.

The data that I'm going to discuss today came from three sources: (a) a thirty-minute sample of free play, (b) measures of intelligence, cognitive style, and motor ability obtained from the child, and (c) measures of peer and family relations and social maturity obtained from the mother.

The variables describing the child's free play were obtained by

observing his behavior in a well equipped playroom similar to the one used at the preschool period (See Slide 10, or Table 1). The child and his mother entered the free-play room where the mother was given a questionnaire which occupied her attention for the whole free play period. They were alone and the child was left to play with any of the materials in the room. A running commentary of the child's behavior was dictated into a tape recorder from behind a one-way vision mirror. (Slide off.) Although a number of measures describing free play were time coded from the narratives, three are of special importance for the discussion here. The first measure, which we have termed Exploring, consisted of the percentage of time in seconds spent shifting between various settings in the playroom. A high score on this variable meant that the child spent a large amount of time physically moving from one focussed play episode to another. The opposite extreme would be the child who would play most of the time at one play setting and would therefore receive a low (or zero) percentage of time in shifting. In addition, an overall rating by the observer of "Exploring the Physical Environment" was highly correlated with the time spent shifting. The other two free play measures describe the <u>pace</u> of the shifting between play settings, one consisting of the mean length of time spent in the shift episodes over the 30-minute session (that is, time spent moving about, but not playing) and the other, the mean rate of shifting measured in the number of feet traversed per second of movement. As might be expected, these latter two variables are moderately negatively related and can be considered as describing a dimension with fast, deliberate and seemingly goal oriented shifts at one end and slower, more meandering shifts in play activity at the other. In other words, a child with very short shifts also tended to have a fast rate when he moved, and vice versa. This did not have to be true, however, as a child could, say, have a relatively longer (or shorter) mean duration shifting and still move at a relatively fast (or slow) pace.

At the end of this free play period, an examiner unknown to the child entered to take him to another room for cognitive testing. Reliable ratings were made at this point of the child's coping with the novel play situation and the stranger, as well as of his general play activity (e.g., vigor, exploration, dependency). These ratings were done by a person who had not known the child in the earlier periods, so they were not contaminated by prior knowledge of the child's behavior.

While the child was being given the cognitive battery in one room, the mother was being interviewed about her child's peer behavior (See Slide 11, or Table 1) -- general questions were obtained about the child's friends, their ages, sex, and where they lived. The final portion of the interview with the mother was given over to administering the Vineland Social Maturity Scale.

In the next slide (See Slide 12, or Table 1) we can see the tests given to the child. The battery of other tests and procedures administered to the child included those we had used in the earlier follow-up study, including the WISC IQ test, and items which measure the child's report of

fantasy level in play.

To recapitulate briefly, then, we had three settings in the follow-up at seven and a half: first, free play with the attendant measures of tempo, style of play, and coping with strangers in the novel environment; second, the maternal interview focussing on the child's peer orientation and social maturity; and third, child testing which explored the areas of intellectual functioning, imagination in play, and motor skills.

The scope of the follow-up study is such that we can only report a small part of the relations between periods in the time I have available here. In general, we have demonstrated some isomorphic continuities in play behavior, social behavior, and cognitive behavior, some of which we have already reported at the Society for Research in Child Development meetings. But there are more metamorphic or heterotypic relations in the data between nursery school behavior and behavior at seven and a half. In addition, we have a number of complex and, at times, difficult to understand sex differences in the longitudinal relations between periods several of which I will report here today.

What I have chosen to do is concentrate <u>first</u> on a set of relations between the three periods studied that are significant for each sex and, at the same time, show the same pattern over time for each sex. For these relations, I will report the correlations for the <u>combined</u> male and female sample but I want to emphasize that the relations do hold for both sexes. The second set I will report on today shows quite distinctive sex differences in the pattern of correlations from age two and a half to seven and a half.

Before I present some of the findings, I want to say that the strategy we employed in this correlational analysis was one of relating adjacent periods sequentially -- that is, newborn to nursery school and then nursery school to seven and a half. We would have had to reduce the sample too much had we restricted the analysis to cases seen at all three periods because some cases were excluded or not studied in the newborn to nursery school link which were subsequently studied in the nursery school to age seven-and-a-half link. For example, some cases were excluded at the newborn period because of complications such as physiological jaundice or because they were outside the age range set for the newborn period. These were factors that would presumably affect newborn behavior but would be less likely to be important in the nursery school or seven-and-a-half-year follow-ups. Turning to the results I wish to report, let me deal first with those relations between two and a half and seven and a half years of age which are significant and in the same direction for both boys and girls. In this section I will talk about combined correlations for ease of presentation.

You will recall from the earlier reports at this symposium that there was a consistently negative relation between the components of the preschool verbal communication class for males and females and respiration

rate obtained in the newborn period. That is, newborns with low respiration rates were more likely to be high in the components of the verbal communication factor, such as ratings of speech development, verbal originality and geographic orientation. For the rest of the presentation I will focus on extending the correlates of this preschool verbal communication factor to a small segment of our seven-and-a-half-year-old follow-up data, thereby linking segmentally the newborn, preschool, and early school-age periods.

The first and most obvious relation to check is the most direct or isomorphic correlate at seven and a half, namely verbal intelligence (Slide 13). As can be seen, for both boys and girls there is indeed a significant relation between verbal IQ at seven and a half and the verbal communication factor at two and a half. (Parenthetically, our results parallel those found in other longitudinal studies in that, while the relation was significant for both sexes, females had a much higher relation between the two periods, ♀ $\underline{r}$ = + .59 vs. ♂ $\underline{r}$ = +.22.) When alerted to pay special attention to all utterances, and when trained to record and rate these on several scales, teachers could assess children's spontaneous speech at two and a half in a way that was reliably related to subsequent verbal intelligence.

You may also recall that manipulative skill and following teachers' games at the preschool period were also consistently negatively related with newborn respiration rate. These relations taken together with those of verbal communication depict preschoolers who tend to be sociable, participating, and communicative. In one sense these preschoolers could have been considered the brighter, more advanced members of the sample. One further corroboration comes from the significant, positive relations of the verbal communication factor at two and a half and scores on the Vineland Social Maturity Scale at seven and a half. High verbal preschoolers also obtained higher scores on social maturity at seven and a half, in addition to higher verbal IQ's. The results parallel those we reported at the Society for Research in Child Development meetings where effective attacks on physical barriers at two and a half was also related longitudinally to higher verbal intelligence as well as to imagination in play, and to ratings of coping and vigor.

Turning to the one measure coded from free play that showed consistent relations to the verbal communication factor for both sexes, we see that children high on verbal communication at two and a half were those who also tended to be high on the measure of exploring (percentage of time shifting between play settings). This finding is consistent with other literature on younger children. Presumably the brighter children tend to process information at a faster rate and therefore in novel environments tend to show more "act changes" or exploratory behavior.

To recapitulate briefly the findings consistent for both sexes -- preschool verbal communication was positively related to verbal IQ, social

maturity, and the exploring in free play at seven and a half. High verbal males and females were brighter, more mature socially, and spent more time exploring a novel play setting.

Longitudinal sex differences were obtained, however, for the pace measures. As can be seen from the slide (Slide 13), the preschool verbal communication factor was positively related to mean length of shifts between play settings for males and negatively related for the females. When we examine the correlates for the speed of shifts, however, we find just the opposite pattern. Here, the preschool verbal communication factor for males was negatively related to the speed or rate of shifts and the female pattern shows just the reverse, verbal communication being positively related to speed of shifts at age seven and a half. In other words, high verbal males later showed slower, more indirect shifts, while high verbal females later shifted quickly and directly between play settings.

When we combine these results with the measure of exploring, i.e., percentage of time spent shifting, we find that while both high verbal males and females spent more time in shifting or exploring the play environment, they differed in the way they changed from setting to setting. High verbal males explored a wide variety of objects but their pace, in contrast to high verbal females, was characterized by slower, more indirect shifting between play settings. The high verbal female also explored, but her play was characterized by rapid, direct shifts between play settings. Looking at the low verbal males and females, we find low verbal males explored little, but, when they did so, darted quickly from setting to setting in an almost unplanned, impulsive way. Low verbal females appeared what could be characterized as hesitant and timid in the free play situation. They explored less and showed indirect, slow shifting between play settings. In a way, they showed little active involvement in the play setting, spending more time completely inactive.

One way of looking at the difference in the pace of exploratory activity between high and low verbal males and females is to think in terms of two constructs, cautiousness and information processing ability. High verbal males, like their female counterparts, are fast habituators in the play setting, exploring and processing a relatively large amount of information. Their play was busy, and imaginative -- using a wide variety of play objects in creative ways. The males, however, are more cautious and "reflective" than the females, and have a tendency to explore, but deliberately and slowly; whereas the females are much less cautious, they "get around" the room more quickly and directly than males.

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Low verbal males and females presumably process information more slowly, and, hence, both explore less and play with fewer objects less imaginatively. Here also we see a difference in cautiousness. The boys appear here to be less cautious, more impulsive and frenetic in their shifts of activity, darting from one activity to another. Females appear hesitant, timid and cautious, not playing much and shifting in a slow deliberate manner.

These latter longitudinal findings, unlike those common to the sexes, are very complex and intriguing. I suspect that when we come to understand them, we will have unlocked some basically new information on the developmental course of children's exploration and cognition. One purpose of this symposium is to open up these long-term relations for discussion.

Table 1

Summary of Method for 7½ Year Follow-Up

Setting	Types of Measures
1. 30 Minutes Free Play in playroom, mother filling out questionnaire	1. Reaction to novel situation 2. Observed tempo and variety of play 3. Reaction to strangers 4. General behavior ratings
2. Mother Interview (during child testing)	1. Maternal interview with detailed week in review covering hours with peers, number of friends, number of peers seen in week, etc. 2. Ratings of peer behavior 3. Vineland Social Maturity Scale
3. Child Testing	1. Draw-a-Person Test (DAP) 2. WISC 3. Maccoby Motor Inhibition Test 4. Singer Imagination Test 5. Siegel Sorting Task 6. Children's Embedded Figures Test (CEFT)
(Break -- Refreshments)	
4. Child Testing	1. Motor Evaluation 2. Muscle Strength Test 3. Minor Physical Anomalies Assessment 4. Height and Weight

Slide #13

INTERCORRELATIONS BETWEEN PERIODS

NEWBORN	2½ YEARS	7½ YEARS	
		+.40	VERBAL IQ
		NO SEX DIFFERENCES[a] +.41	VINELAND SQ
		+.29	EXPLORATORY PLAY
RESPIRATION RATE -.33[a]	VERBAL COMMUNICATION FACTOR		
		+.42♂	X SHIFT LENGTH (NONPLAY)
		-.38♀	
		SEX DIFFERENCES	
		-.37♂	SPEED OF SHIFTS
		+.41♀	

NOTE.—ALL CORRELATIONS SIGNIFICANT AT $p < .05$.

[a]COMBINED MALE AND FEMALE CORRELATIONS.